DOCUMENT RESUME

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TITLE	Math. Multiplication & Division of Common Fractions and Whole & Mixed Numbers. Pre-Apprenticeship Phase 1 Training.
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IDENTIFIERS	*Mixed Numbers; *Preapprenticeship Programs

ABSTRACT

One of a series of pre-apprenticeship phase 1 training modules dealing with math skills, this self-paced student module covers the multiplication and division of common fractions and whole and mixed numbers. Included in the module are the following: cover sheet listing module title, goals, and performance indicators; introduction; study guide/check list with directions for module completion; information sheet; self-assessment; self-assessment answers; and post assessment. Emphasis of the module is on computing problems typically encountered by workers in the skilled trades. (Other related pre-apprenticeship phase 1 training modules are available separately--see note.) (MN)

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ED217286

INDIVIDUALIZED LEARNING SYSTEMS

PRE-APPRENTICESHIP PHASE 1 TRAINING

MATH

MULTIPLICATION & DIVISION OF COMMON FRACTIONS AND WHOLE & MIXED NUMBERS

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Goal:

The student will know the necessary math concepts in the multiplication and division of common fractions and whole and mixed numvers to enable him or her to compute math problems in which these concepts are used.

Performance Indicators:

Given a series of math problems in the Self Assessment and Post Assessment portions of this module, the student will be able to successfully compute the answers.

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Introduction

The previous module reviewed the rules and procedures for some fundamental operations with common fractions: reduction of fractions, finding the lowest common denominator, and adding and subtracting fractions and mixed numbers. The study assignment for the present module concludes the review of common fractions, covering the rules and procedures for multiplying and dividing common fractions and common fractions in combination with whole numbers and mixed numbers.

Study Guide

This study guide is designed to help you successfully complete this module. Check off the following steps to completion as you finish them.

STEPS TO COMPLETION

1. ____ Familiarize yourself with the Goal and Performance Indicators on the title page of this module.

2. ____ Read the Introduction and study the Information section of this module. It is intended to provide you with the math skills necessary to successfully complete the assessment portions.

3. ____ Complete the Self Assessment section of the module. You may refer to the Information section for help.

4. ____ Compare the Self Assessment answers with the correct answers on the Self Assessment Answer Sheet immediately following the Self Assessment exam. If you missed more than one of the Self Assessment exam questions, go back and re-study the necessary portions of the Information section, or ask your instructor for help. If you missed one or none of these problems, go on to step 5.

5. ____ Complete the Post Assessment section of the module. Show your answers to the instructor. It is recommended that you score 90% or better on those Post Assessment exams with 10 or more problems, or miss no more than one problem on those with fewer than 10 problems, before being allowed to go on the next math module.

Information

MULTIPLYING FRACTIONS

The procedure for multiplying fractions is to multiply the numerators together to find the numerator for the answer. Then, multiply the denominators together to find the denominator for the answer. The answer is called a PRODUCT and the fraction is reduced to its lowest form. Example: 4 times 5/8 = 4/1 x 5/8 = 20/8 = 2 4/8 = 2 1/2.

PROBLEMS IN MULTIPLYING FRACTIONS

If standard brick are used which are 2 1/4 in. thick to lay a wall with 3/8 in. mortar joints, what will the height of the wall be after nine courses?

Answer: First, add the thickness of one mortar joint to the thickness of one brick (2 1/4" + 3/8" = 2 5/8"). Then multiply 2 5/8" times 9 to find the height. 2 5/8" x 9 = 21/8 x 9/1 = 189/8 = 23 5/8 in.

If a set of steps are five risers high and each riser is 7 1/4 in., what is the total rise of the steps?

Answer: 7 1/4 x 5/1 = 29/4 x 5/1 = 145/4 = 36 1/4 in.

What is the length of a 28 stretcher wall if each stretcher is 7 1/2 in. and the mortar joint is 1/2 in.?

Answer: 7 1/2" = 1/2" = 8"; 8" x 28" = 224"; 224" ÷ 12 = 18 2/3' (2/3 x 121 = 24/3 = 8 in.) Therefore the length is 18'8"

DIVIDING FRACTIONS

The process of dividing fractions is accomplished by inverting (turning up side down) the divsor and then multiplying. For example, 3/8 ÷ 3/4 is solved by changing the 3/4 to 4/3. Therefore, 3/8 ÷ 3/4 = 3/8 x 4/3 = 12/24 = 1/2.

PROBLEMS IN DIVIDING FRACTIONS

How many risers 7 1/2 in. high would be required to construct a flight of concrete steps 3' 1 1/2" high?

Answer: Change 3'1 1/2" to 37 1/2"; Divide 37 1/2" by 7 1/2; $75/2 \div 15/2 = 75/2 \times 2/15 = 150/30 = 5$ risers

If a brick mantel is corbeled out 4 1/2 in. in six courses, how much does each course project past the previous course?

Answer: $4\ 1/2 \div 6/1 = 9/2 \times 1/6 = 9/12 = 3/4$ in.

If a story pole was 8'11 1/2" long and divided into 39 equal spaces, what is the length of each space?

Answer: 8'11 1/4" $\div$ 39 = 107 1/4' $\div$ 39/1 = 429/4 x 1/39 = 429/156 = 2 117/156 = 2 3/4 in.

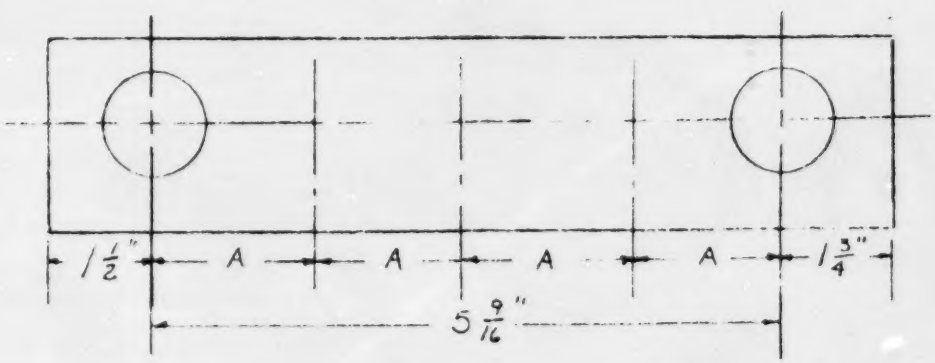
Self Assessment

How many pieces of 10 5/16" flat bar may be cut from a 12-foot piece of stock if you allow 3/16" for the kerf?

How many pieces of stock 7/8" long can be cut from a 30" bar of drill rod if 1/16" is allowed on each piece for kerf?

Determine center distance A.

A = _____



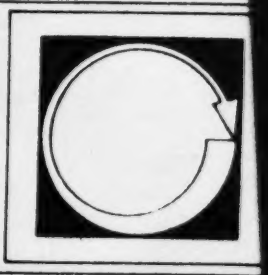
Self Assessment Answers

13 pieces of flat bar

32 pieces of stock

A = 1 25/64

Post Assessment



Listed below each problem are four possible answers. Decide which of the four is correct, or most nearly correct; then write the letter for that answer in the blank space to the left of the problem.

1. ____ The product of 1/2 x 7/8 is:

   a. 1/8
   b. 5/16
   c. 7/16
   d. 1 1/8

2. ____ The product of 3/4 x 2/3 is:

   a. 5/12
   b. 1/2
   c. 5/7
   d. 8/9

3. ____ The quotient of 1/2 ÷ 1/4 is:

   a. 1/8
   b. 3/4
   c. 1
   d. 2

4. ____ The quotient of 1/4 - 1/2 is:

   a. 1/2
   b. 4/6
   c. 5/6
   d. 13/18

5. ____ The quotient of 1/4 ÷ 1/3 is

   a. 1/9
   b. 1/6
   c. 3/4
   d. 1 1/3

6. ____ If a roll of carpet weighs 467 1/2 lbs. and a running foot of the carpet weighs 2 1/8 lbs., how many running feet are in the roll?

   a. 200
   b. 220
   c. 374
   d. 935

7. ____ A type of linoleum weighs 1 5/6 lbs. per running foot. How many pounds does a roll containing 59 2/3 running feet weigh?

   a. 103 1/6
   b. 109 2/3
   c. 109 7/8
   d. 116 7/18

8. ____ A piece of pipe must be cut to 3/8 the length of another pipe, which is 9' long. How long a piece must be cut?

   a. 3 1/4'
   b. 3 3/8'
   c. 4 1/4'
   d. 4 3/8'

9. ____ What is the height of the second floor above the first if the stairway connecting the floors has 16 risers and each riser is 7 1/4" high?

a. 8'10"
b. 9'0"
c. 9'6"
d. 9'8"

10. ____ A truck rated at 1 1/2 tons is to be used to pick up surplus gravel at five local job sites and return it to the yard. The amount of surplus gravel at each site is as follows: job A, 3/4 ton; job B, 3/8 ton; job C, 1 7/8 tons; job D, 1 1/2 tons, and job E, 2 5/8 tons. How many trips to the yard must the truck make to return all the gravel?

a. 3
b. 4
c. 5
d. 6